[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2014-1075; Special Conditions No. 25-599A-SC]

Special Conditions: Dassault Aviation Model Falcon 6X Airplane; Hydrophobic Windshield Coatings in Lieu of Windshield Wipers.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions, amendment.

SUMMARY: These amended special conditions are issued for the Dassault Model Falcon 6X airplane. This airplane will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is hydrophobic windshield coatings in lieu of windshield wipers. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on Dassault on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Paul Pellicano, AIR-625, Performance and Environment Section, Technical Innovation Policy Branch, Policy and Innovation Division, Federal Aviation Administration, 1701 Columbia Avenue, College Park, GA 30337; telephone and fax 404-474-5558, e-mail Paul.Pellicano@faa.gov.

SUPPLEMENTARY INFORMATION:

Background

On July 1, 2012, Dassault Aviation applied for a type certificate for their new Model Falcon 5X airplane. Special conditions were issued for that design on September 15, 2015 (80 FR 55226). However, Dassault has decided not to release an airplane under the model designation Falcon 5X, instead choosing to change that model designation to Falcon 6X.

In February of 2018, due to engine supplier issues, Dassault extended the type certificate application date for their Model Falcon 5X airplane under new Model Falcon 6X. This amendment to the original special conditions reflects the model-name change. This airplane is a twin-engine business jet with seating for 19 passengers and a maximum takeoff weight of 77,460 pounds. The Dassault Model Falcon 6X airplane design remains unchanged from the Model Falcon 5X in all material respects other than different engines.

Type Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Dassault Aviation must show that the Model Falcon 6X airplane meets the applicable provisions of part 25, as amended by Amendments 25-1 through 25-146.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Dassault Model Falcon 6X airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model Falcon 6X airplane must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type-certification basis under § 21.17(a)(2).

Novel or Unusual Design Features

The Dassault Model Falcon 6X airplane flight deck design incorporates a hydrophobic coating as a primary means to provide adequate windshield view in the presence of atmospheric precipitation. Reliance on such a coating, in lieu of wipers, constitutes a novel or unusual design feature for which the applicable airworthiness regulations do not contain adequate or appropriate safety standards.

Discussion

Section 25.773(b)(1) requires a means to maintain a clear portion of the windshield for both pilots operating a transport-category airplane to have a sufficiently extensive view along the flight path during precipitation conditions. The regulations require this means to maintain such an area of clear vision during heavy-rain precipitation at airplane speeds up to 1.5 V_{SR1}.

This requirement has existed in principle since 1953 in part 4b of the "Civil Air Regulations" (CAR). Section 4b.351(b)(1) required that "Means shall be provided for maintaining a sufficient portion of the windshield clear so that both pilots are afforded a sufficiently extensive view along the flight path in all normal flight attitudes of the airplane. Such means shall be designed to function under the following conditions without continuous attention on the part of the crew: (i) In heavy rain at speeds up to 1.6 V_{S1}, flaps retracted."

Effective December 26, 2002, Amendment 25-108 changed the speed for effectiveness of the means to maintain an area of clear vision from up to 1.6 V_{S1} to 1.5 V_{SR1} to accommodate the redefinition of the reference stall speed from the minimum speed in the stall, V_{S1}, to greater than or equal to the 1g stall speed, V_{SR1}. As noted in the preamble to the final rule for that

amendment, the reduced factor of 1.5 on V_{SR1} is to maintain approximately the same speed as the 1.6 factor on V_{S1}.

The requirement that the means to maintain a clear area of forward vision must function at high speeds and high precipitation rates is based on the use of windshield wipers as the means to maintain an adequate area of clear vision in precipitation conditions. The requirement in 14 CFR 121.313(b) and 125.213(b) to provide "… a windshield wiper or equivalent for each pilot station …" has remained unchanged since at least 1953.

The effectiveness of windshield wipers to maintain an area of clear vision normally degrades as airspeed and precipitation rates increase. It is assumed that because high speeds and high precipitation rates represent limiting conditions for windshield wipers, they will also be effective at lower speeds and precipitation levels. Accordingly, § 25.773(b)(1)(i) does not require maintenance of a clear area of forward vision at lower speeds or lower precipitation rates.

A forced airflow blown directly over the windshield has also been used to maintain an area of clear vision in precipitation. The limiting conditions for this technology are comparable to those for windshield wipers. Accordingly, introduction of this technology did not present a need for special conditions to maintain the level of safety embodied in the existing regulations.

Hydrophobic windshield coatings may depend to some degree on airflow to maintain a clear-vision area. The heavy rain and high speed conditions specified in the current rule do not necessarily represent the limiting condition for this new technology. For example, airflow over the windshield, which may be necessary to remove moisture from the windshield, may not be adequate to maintain a sufficiently clear-vision area of the windshield in low-speed flight or during surface operations. Alternatively, airflow over the windshield may be disturbed during such critical times as the approach to land, where the airplane is at a higher-than-normal pitch attitude. In these cases, areas of airflow disturbance or separation on the windshield could cause failure to maintain a clear-vision area on the windshield.

In addition to potentially depending on airflow to function effectively, hydrophobic coatings may also be dependent on water-droplet size for effective precipitation removal. For example, precipitation in the form of a light mist may not be sufficient for the coating's properties to result in maintaining a clear area of vision.

The current regulations identify speed and precipitation rate requirements that represent limiting conditions for windshield wipers and blowers, but not for hydrophobic coatings. Likewise, it is necessary to issue special conditions to maintain the level of safety represented by the current regulations.

These special conditions provide an appropriate safety standard for the hydrophobic-coating technology as the means to maintain a clear area of vision by requiring the coating to be effective at low speeds and low precipitation rates, as well as at the higher speeds and precipitation rates identified in the current regulation.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

The FAA issued *Final special conditions, request for comment* Special Conditions No. 25-599-SC for the Dassault Model Falcon 5X airplane, which was published in the *Federal Register* on September 15, 2015 (80 FR 55226). No comments were received, and the special conditions are adopted as proposed, with amendments.

Applicability

As discussed above, these special conditions are applicable to the Dassault Model Falcon 6X airplane. Should Dassault apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the Dassault Model Falcon 6X airplane. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type-certification basis for Dassault Model Falcon 6X airplanes.

The airplane must have a means to maintain a clear portion of the windshield, during precipitation conditions, enough for both pilots to have a sufficiently extensive view along the ground or flight path in normal taxi and flight attitudes of the airplane. This means must be designed to function, without continuous attention on the part of the flightcrew, in conditions from light misting precipitation to heavy rain, at speeds from fully stopped in still air, to 1.5 V_{SR1} with lift and drag devices retracted.

Issued in Kansas City, Missouri, on January 4, 2022.

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